SCAG Heavy-Duty Truck Model Update

presented to
Goods Movement Task Force Meeting

presented by
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Transportation leadership you can trust.

Overview of Existing SCAG HDT Model

- Three truck weight classes – Correspond to trip purposes
- Internal model – Trip rates by land use and gravity model
- External model – Commodity flows converted to truck trips and disaggregated to TAZs
- Special generator models – Ports and air cargo

Review of Existing Model (Task 2)

Recommendations – External Model

- Improve Representation of Intermediate Handling Locations
- Improve Software for Trip Table Estimation
- Update the commodity flow inputs to the external model
- Revise the payload matrix in the external model
- Adjust the routing assumptions for selected O-D pairs in the external model
- Adjust the through factors and empty factors in the external model

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Review of Existing Model (Task 2) (continued)

Recommendations – Internal Model

- Revise trip rates for warehouse and distribution trips, local pickup and delivery trips, and service trips
- Incorporation of robust database on trip length frequency distributions and Gravity model by GVW

Recommendations – Special Generator Model and Assignments

- Incorporate POLB/POLA trip tables into SCAG model
- Develop Trip Tables for Rail Intermodal Terminals
- Revise time-of-day factoring
- Update PCE factors and volume-delay functions

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Internal Model (Tasks 3 and 6)

- Improve data for estimating trip generation and distribution
- Investigate introducing new trip purposes for generation and distribution models
- Convert to new zone system

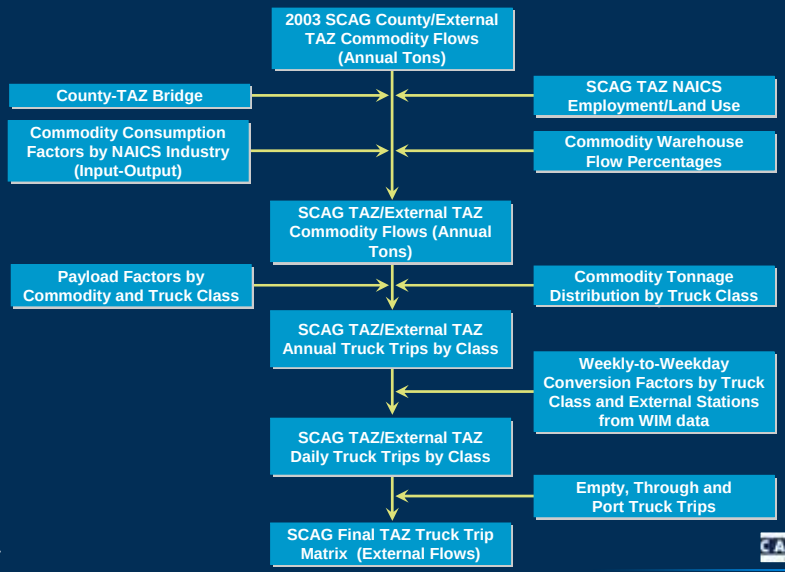
Internal Model Data Improvements (Task 3)

- Four trip types
  - Manufacturing – No new data collection
  - Warehouse and distribution centers – TRANSEARCH pre-cursor data, new interviews, MTA TLN survey results
  - Urban pickup and delivery – Trip diaries
  - Service – Trip diaries
- Sample frame – DMV registration data
  - Cluster sampling by vehicle/fleet
- Stratification
  - Weight class
  - Business type (owner)

Internal Model Data Improvements (Task 3) (continued)

- **Survey Implementation**
  - Recruiting by phone – match body type and business classification to conduct sample stratification by business/truck use type
  - Phone and mail-back retrieval
  - Incentives – Fleet coordinator and driver
  - Data verification – Limited GPS being considered

Improve External Model (Tasks 4 & 5)
Flowchart for Modeling Methodology



External Model Data (Task 4)

- Commodity flow data – 1996 ITMS forecasted
- Updated land use and employment data by 4-digit NAICS
- LTL trucking terminal locations
- Truck payload factors and tonnage distributions by weight class – SCAG surveys, WIM, and VIUS

Enhancements to ITMS Data (Task 4)

- Comparison of ITMS O-D commodity flow data with Freight Analysis Framework (FAF 2002)
  - Accounted for under-representation of flows in ITMS
    - SCAG and Bay Area
    - SCAG and Nevada
    - SCAG-Mexico Imports and Exports
- Further enhancements to ITMS commodity flows based on Caltrans truck counts (especially accounting for U.S./Mexico maquiladora traffic)

External Model (Task 5)

- Improvements to warehouse flow representation
- Update data sources
- Code procedures in TransCAD

Enhancements to External TAZ Commodity Flow Distributions (Task 5)

- Better distribution of commodity flows to external TAZs in the external truck model based on O-D patterns
  - Internal-External (IE) and External-Internal (EI) flows:
    - Accounting for truck trip chaining (eg., fractional distribution of SCAG-Bay area truck flows through US-101)
    - Improved distribution of SCAG-Kern County flows to I-5 and CA-14
    - Improved distribution of flows to I-5 and I-15 external cordons south of the SCAG region
    - Improved distribution of flows between SCAG and southern US states (AZ,NM,TX) to I-10 and I-15 (south) to account for truck flow distribution patterns through I-15, connecting with I-8
  - External-External (EE) flows:
    - Improved distribution of EE flows at each external cordon to other external cordons

External Model Validation (Task 5)
Total HDT – External Station

External Cordon Station	Total HDT			
	SCAG External HDT Model	Caltrans Truck Counts	Differences	
US 101 (Santa Barbara County Line)	5,669	5,594	75	1%
I-5 (Kern County Line)	24,002	21,083	2,919	14%
CA 14 (Kern County Line)	2,314	2,227	87	4%
US 395 (Kern County Line)	716	794	-78	-10%
I-15 (Nevada State Line)	8,142	7,780	362	5%
I-40 (Arizona State Line)	7,698	7,584	114	2%
I-10 (Arizona State Line)	10,775	10,170	605	6%
I-8 (Arizona State Line)	3,145	3,314	-169	-5%
Rte. 111 (Calexico)	911	1,610	-699	-43%
I-8 (San Diego County Line)	2,879	2,500	379	15%
I-15 (San Diego County Line)	11,304	11,503	-199	-2%
I-5 (San Diego County Line)	14,119	12,945	1,174	9%
Total	91,674	87,105	4,569	5%
RMSE	#counts	sqrdiff	RMSE	
	12	11,128,811	13.9%	

External Model Validation (Task 5)
Total HDT – Screenlines

Screenlines	Total HDT			
	SCAG External HDT Model	Caltrans Truck Counts	Differences	
US 101 (Santa Barbara County Line)	5,669	5,594	75	1%
I-5 (Kern County Line)	24,002	21,083	2,919	14%
CA 14 (Kern County Line)	2314	2,227	87	4%
Subtotal 1	31,985	28,904	3,081	11%
I-10 (Arizona State Line)	10,775	10,170	605	6%
I-8 (Arizona State Line)	3,145	3,314	-169	-5%
Subtotal 2	13,920	13,484	436	3%
I-8 (San Diego County Line)	2,879	2,500	379	15%
I-15 (San Diego County Line)	11,304	11,503	-199	-2%
I-5 (San Diego County Line)	14,119	12,945	1,174	9%
Subtotal 3	28,302	26,948	1,354	5%

Special Generator Models (Task 7)

- Port – LA/LB
  - Trip generation based on port QuickTrip model and current cargo forecasts
  - Trip distribution – Fixed O-D matrix from summer gate surveys
- Rail intermodal
  - Trip tables based on carrier and shipper surveys for LA Metro Cube Cargo model

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Trip Assignment (Task 8)

- Simplify PCE factors
- Adjust time of day factors – Based on new survey results
- Modify VDFs

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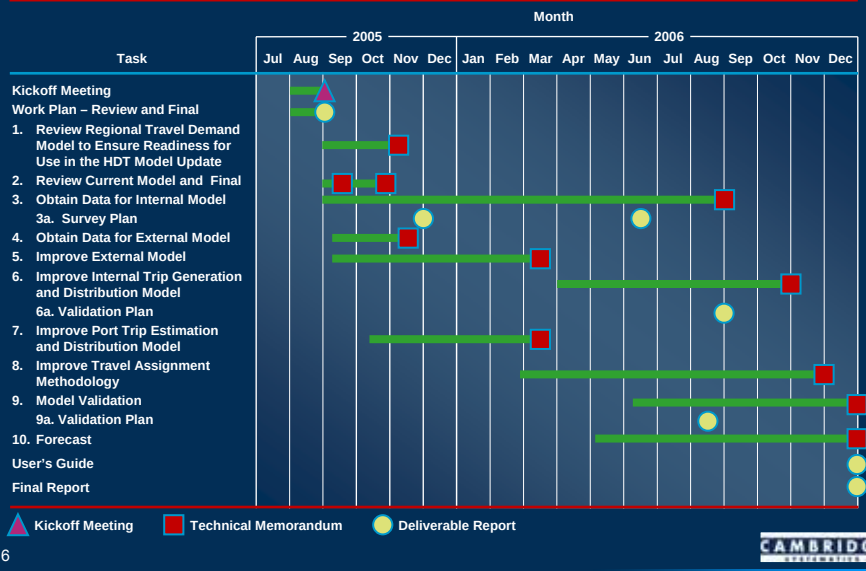
Schedule


Month
2005
2006
Task
Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Kickoff Meeting
Work Plan – Review and Final
1. Review Regional Travel Demand Model to Ensure Readiness for Use in the HDT Model Update
2. Review Current Model and Final
3. Obtain Data for Internal Model
3a. Survey Plan
4. Obtain Data for External Model
5. Improve External Model
6. Improve Internal Trip Generation and Distribution Model
6a. Validation Plan
7. Improve Port Trip Estimation and Distribution Model
8. Improve Travel Assignment Methodology
9. Model Validation
9a. Validation Plan
10. Forecast
User's Guide
Final Report
Kickoff Meeting
Technical Memorandum
Deliverable Report